

REMARKS

Claims 1-19 are pending, with claims 1, 3, 4, and 17-19 being independent. Claims 13-16 have been cancelled by this amendment without prejudice. Claims 18 and 19 have been amended. New claims 20-23 have been added. No new matter has been added. Reconsideration and allowance of the above-referenced application are respectfully requested.

INFORMATION DISCLOSURE STATEMENT

Consideration of the information disclosure statement submitted July 15, 2005, and an initialed 1449 form are respectfully requested.

ABSTRACT

The abstract of the disclosure stands objected to for being shorter than the recommended 50 words. The abstract has been amended as required. Thus, withdrawal of this objection is respectfully requested.

CLAIMS

Claims 1, 3-5, 12-15, and 17-19 stand rejected under 35 U.S.C. 102(b) as allegedly being anticipated by Ishikawa (US 6,066,829). Claims 6-11 and 16 stand rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Ishikawa. Claim 2 stands rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Ishikawa in view of Woelki et al. (US 5,329,090). These contentions are respectfully traversed.

Ishikawa describes a laser marker that marks a workpiece surface by laser beam scanning, where a virtual marking test is performed to facilitate mark positioning for a character pattern to be marked on the workpiece. "In an embodiment, before the actual marking, a visible guide beam continuously and repeatedly scans the workpiece surface to form a projected image of the pattern or its domain. In another embodiment, before the actual marking, a visual display superimposes an image of the pattern and/or domain on a monitored image of the workpiece from a monitor camera. An automatic marking pattern generator is provided to automatically

determine the character pattern to be marked from the entered character and marking area information.” (See Ishikawa at Abstract.) A human operator places a workpiece W on a workbench 18 and positions the workpiece, as desired, in the pattern projection mode. (See Ishikawa at col. 8, lines 31-48.)

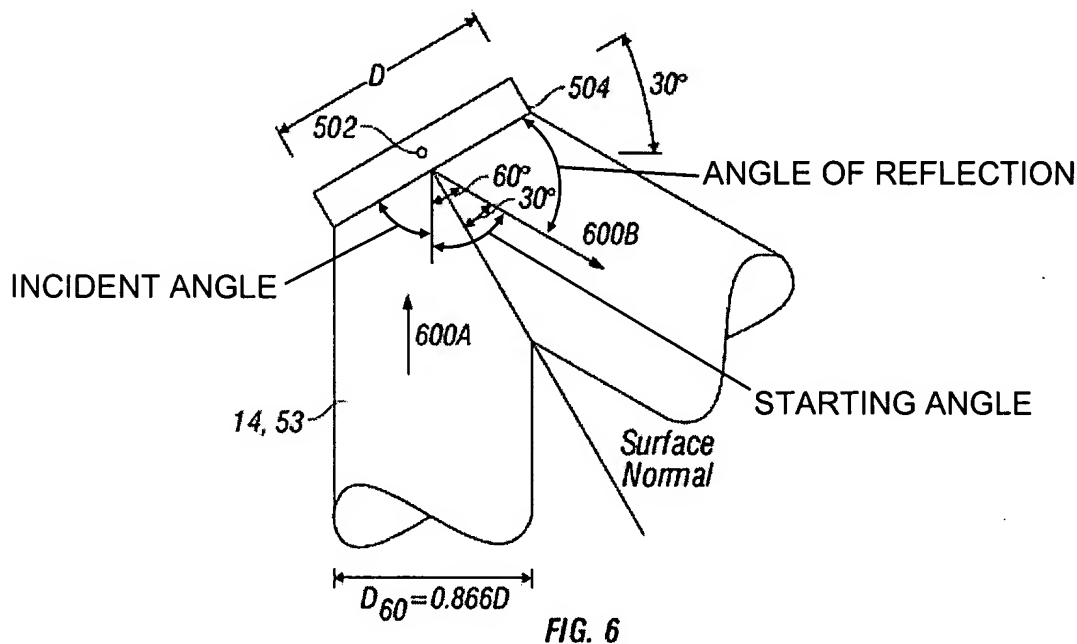
Independent claim 1 of the present application recites, “reflecting an incident light beam by a starting angle of less than ninety degrees to form a first reflected light beam”, and independent claim 3 recites, “reflecting the first reflected light beam by a starting angle of less than ninety degrees to form a second reflected beam” (emphasis added). Independent claims 4 and 17 include limitations similar to claims 1 and 3, respectively. Thus, each of independent claims 1, 3, 4, and 17 recite, “a starting angle of less than ninety degrees” (emphasis added).

Nowhere does Ishikawa describe a starting angle of less than ninety degrees. The Official Action asserts this limitation is inherently present in Ishikawa because, “the incident angle of the laser beam on the first reflecting mirror 52 should be always less than ninety degrees so that the laser beam would not glide on the surface of the first reflecting mirror and that the reflected laser beam could reach the second reflecting mirror 54” (see Official Action at page 3; emphasis added). However, it is inappropriate to equate the recited “starting angle” of the claims with the incident angle in Ishikawa.

As described in the present application in connection with Figure 5: “The 90-degree angle between the incident beam 500A and reflected beams 500B is called a ‘nominal’ angle (also called ‘starting’ angle or ‘base’ angle), which is a starting angle that changes as each mirror 66, 68 in Fig. 4B is tilted along an axis 502 (Fig. 5) by actuators 70 (Fig. 4C) to control printing along x and y directions to form spots on the product 22 (Fig. 1A), as described in further detail below.” (See U.S. App. Pub. No. 2005-0088510 at ¶ 78.) Figure 6 of the present application shows an example configuration in which a starting angle is less than ninety degrees: “Fig. 6 illustrates a mirror 504, which represents a variation of at least one of the mirrors 66, 68 in Fig. 4B. The mirror 504 is positioned to reflect an incident light beam 600A (the printing beam 14 and/or the print zone beam 53) by 60 degrees to form a reflected beam 600B. The angle between

the reflected beam 600B and the incident beam 600A is 60 degrees.” (See U.S. App. Pub. No. 2005-0088510 at ¶ 80.)

Figure 6 is reproduced below with labels for the relevant angles added, as would be clearly understood by one skilled in the art, in view of the present disclosure. The incident angle (IA) equals the angle of reflection (AR) by definition. The starting angle (SA) equals one hundred and eighty degrees minus two times the incident angle, according to the principles of geometry ($SA = 180 - IA - AR = 180 - 2 IA$).



Thus, a starting angle of less than ninety degrees is equivalent to an incident angle of greater than forty-five degrees ($IA = 90 - SA/2 = 90 - \{<90\}/2 = \{>45\}$). As shown in Figure 6, the starting angle is sixty degrees and the incident angle is sixty degrees. This claimed subject matter can result in significant advantages in a laser printing system. (See e.g., U.S. App. Pub. No. 2005-0088510 at ¶s 92-93.) Nowhere does Ishikawa teach or suggest an incident angle of greater than forty-five degrees or a starting angle of less than ninety degrees, as claimed.

Thus, independent claims 1, 3, 4, and 17 should be in condition for allowance. Dependent claims 2 and 5-12 are patentable based on the above arguments and the additional

recitations they contain. For example, the limitations of claims 5-7 are not directly addressed in the Official Action, and the reliance on In re Boesch is inappropriate since no evidence has been provided that the starting angle was previously recognized as a result-effective variable. (See e.g., MPEP 2144.05(II)(B).) Thus, claims 5-7 are patentable for at least these additional reasons.

Dependent claim 8 recites, "the first actuator and the first mirror control printing by the second reflected beam in a vertical direction on the object." Dependent claim 9 recites, "the second actuator and the second mirror control printing by the second reflected beam in a horizontal direction on the object." Various benefits of these reversed optics configurations are clearly described in the present application. (See U.S. App. Pub. No. 2005-0088510 at ¶s 94-100.) In contrast, Ishikawa's first actuator 56 and first mirror 52 control printing in a horizontal direction, and Ishikawa's second actuator 58 and second mirror 54 control printing in a vertical direction, which is the opposite of the claimed subject matter. (See Ishikawa at col. 6, lines 44-49, and col. 1, line 40-44.) Moreover, the citation to In re Japikse is inappropriate since the Official Action's restatement of the holding of this case is incorrect, and because the claimed rearranging of parts does in fact modify the operation of the device. (See e.g., 2144.04(VI)(C) and U.S. App. Pub. No. 2005-0088510 at Figs. 9A and 9B.) Thus, claims 8-9 are patentable for at least these additional reasons.

Independent claims 18-19 are also directed to reversed optics implementations. Ishikawa fails to teach or suggest the reversed optics system and method of claims 18 and 19 because Ishikawa clearly describes the first actuator and mirror controlling scanning in the X (horizontal/parallel) direction and the second actuator and mirror controlling scanning in the Y (vertical/perpendicular) direction, which is the opposite of the claimed subject matter. Nonetheless, claims 18 and 19 have been amended to clarify that the claimed perpendicular and parallel directions are relative to the direction of movement of an object, where the movement of the object occurs during the scanning of the object by the beam. As described in the present application, this reversed optics configuration may provide more horizontal space to print on a moving product and allows the printing system to print sooner in the print zone. (See U.S. App.

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Pub. No. 2005-0088510 at ¶s 99-100.) Ishikawa fails to teach or suggest this claimed subject matter. Thus, claims 18 and 19 should be in condition for allowance.

New dependent claims 20-23 recite additional limitations regarding the angles of reflection of the first and second reflected light beams. These claims should also be in condition for allowance.

Enclosed is a check in the amount of \$120.00 for the 1-Month Extension of Time fee. Please apply and any other necessary charges or credits, to deposit account 06-1050.

Respectfully submitted,

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